

- Gastric juice - pepsin is acid and turns proteins into peptones.
- the heat of the stomach starts to dissolve the fat.
  - gastric juice does not work on starch or fat.
  - undigested food is in the form of minute lobules.
  - food when ready goes into the small intestine.
  - acts as a disinfectant to (e.g.) rotten meat.

Food passes from stomach into the small intestine, by pyloric opening through to the ileocecal valve.

- Small intestine - length of 21 ft.
- it is divided into
    - 1) duodenum - 12 finger widths
    - 2) jejunum - 8 " "
    - 3) ileum - 11 " "

- the coats are the same as those of the stomach, being drawn up into folds of mucous, "valvulae and conniventes", so that food will not pass through too quickly. These are covered with projections the "mili".
- there are also glands in this coat called Peyer's patches.
- two digestive juices bile and pancreatic juice are brought forth by ducts into the small intestine.

Acting principle in gastric juice is pepsin - changes proteins into peptones.

Acting principle in bile is bilin - is alkali and acts on fats.

Acting principle in pancreas is pancreaticin - is alkali and acts on saliva + fats.



Large intestine - is 6 ft. long.  
- Ascending  
- Transverse } Colon  
- Descending }

Coats are similar to those of the small intestine.  
Chyle is absorbed all the time.  
Food is in the large intestine from 24 to 36 hours.  
The join between the small and large intestine is called the ileo caecal valve.

### Uses of food.

- 1) Picks up the heat of the body.
- 2) Supplies energy.
- 3) Makes good the loss of, and replaces worn tissue.
- 4) Helps growth.

Loss of water in one day  $3\frac{1}{2}$  to 5 pts.  
Three pints of water should be drunk daily.

<u>Water content</u>	vegetables - 90%
	bread - 40%
	milk - 87%.

Water is second to oxygen in the necessity of the body.

- 1) it keeps the blood fluid
- 2) it assists in the removal of wastes.

Mineral salts - 1) hydrochloric acid - salt and gastric juice.  
2) lime - building bone.  
3) phosphorus - makes hemoglobin for red corpuscles.

Proteins - true proteins  
albumoses  
peptones



Uses of proteins - to build nitrogenous tissue of the body and to repair it when worn out.

Fats - produce heat and energy.  
Carbohydrates - " " " " but are inferior to fats for this purpose.  
- help and stimulate digestive organs.

Basis of any diet - 300 grains  $N_2$  a day.  
4800 grains C a day.

A person dieting is usually acid.

<u>A balanced diet</u>		$N_2$	C.
proteins	$4\frac{1}{2}$ oz.	310 gr.	1040 gr.
fats	3 oz.	—	1040 gr.
starches	14 oz.	—	2720 gr.
salts	1 oz.	—	—
	$22\frac{1}{2}$ oz.	310 gr. $N_2$ .	4800 gr. C.

Vitamins - lack of vitamin A - rickets  
" " " B - sleeping sickness  
" " " C - scurvy.

Foods - milk + eggs - most perfect foods. (egg has no salt)  
butter - is pure fat.  
cheese - very concentrated nitrogenous food.

Meats - beef - most nutritious  
mutton + lamb -  
pork - difficult to digest  
veal - less nutritious, indigestible.

Meals - should be four hours apart  
no water should be drunk.  
light conversation talked  
rest after meals  
on even diet - plenty of fruit and vegetables.

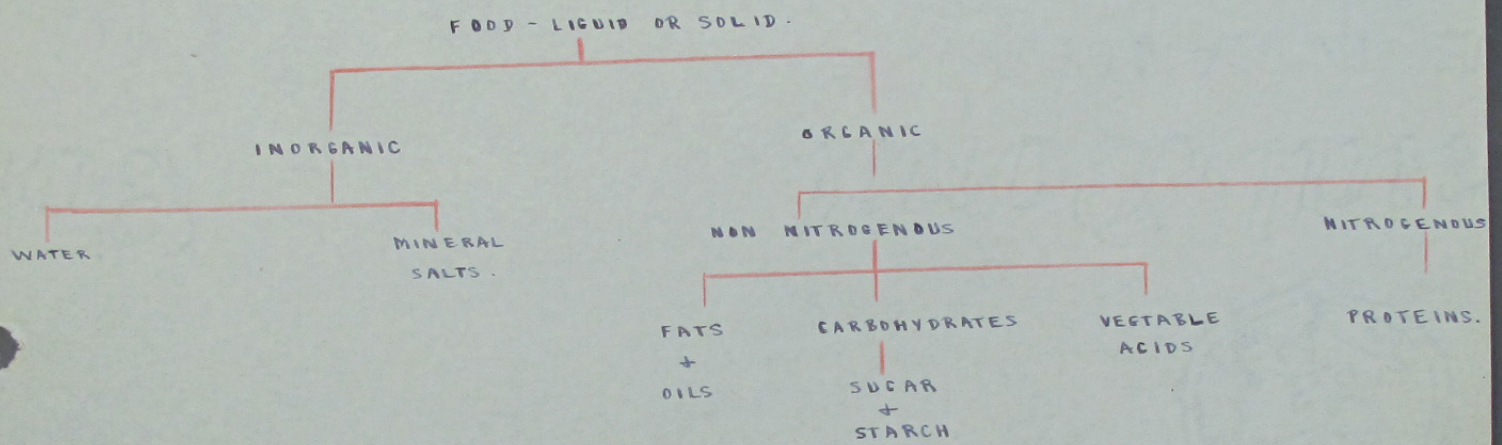


# DIGESTIVE CHART.

	MOUTH	ESOPHAGUS	STOMACH	SMALL INTESTINE	LARGE INTESTINE
<u>PROTEINS</u>	FOOD MASTICATED BY THE BY THE TEETH AND MIXED WITH SALIVA.	NO ACTION.	FOOD IS CHURNED, AND IS MADE ACID BY THE ACTION OF GASTRIC JUICE. PROTEINS ARE TURNED INTO PEPTONES.	FOOD IS TURNED ALKALINE BY JUICE FROM THE PANCREAS. PANCREATIC JUICE STILL KEEPS CHANGING PROTEINS INTO PEPTONES.	FOOD IS GRADUALLY ABSORBED
<u>STARCHES</u>	FOOD MASTICATED BY THE TEETH AND MIXED WITH SALIVA WHICH TURNS STARCH TO GRAPE SUGAR.	NO ACTION, EXCEPT THE SALIVA IS STILL WORKING AND ABSORPTION IS IS STARTED BY THE BLOOD VESSELS IN THE MUCOUS COAT.	FOOD IS CHURNED AND SALIVA CONTINUES TO TO WORK UNTIL FOOD IS ACID.	STARCHES ARE MADE ALKALINE AND ARE CHANGED INTO GRAPE SUGAR. AS SOON AS THEY ARE DISSOLVED, ABSORPTION STARTS.	THROUGH THE WALLS OF THE
<u>FATS</u>	FOOD MASTICATED BY THE TEETH.	MIXED IN MUCOUS.	FOOD IS CHURNED AND THE CELLULAR COAT AROUND THE FAT IS DISSOLVED, THEN THE HEAT OF THE STOMACH MELTS THE FAT.	ACTION OF BILE RENDERS FOOD ALKALINE. FATS ARE AMULSIFIED BY BILE AND PANCREATIC JUICE AND MADE FIT FOR ABSORPTION BY THE LACTEALS.	LARGE INTESTINE.

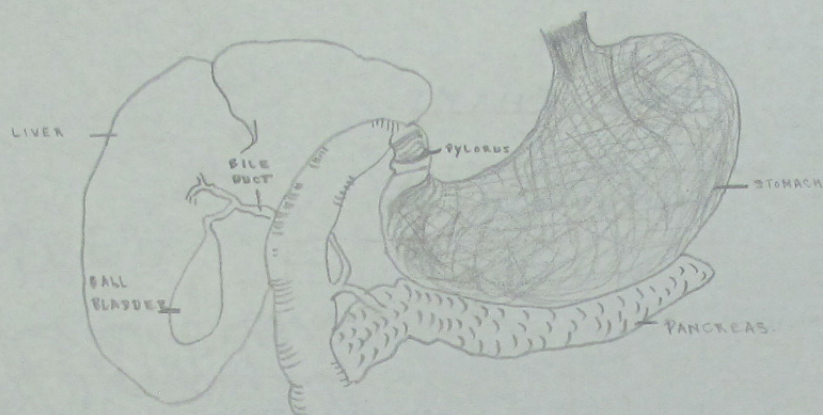


## FOOD CHART.

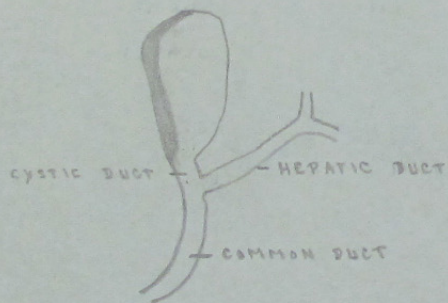




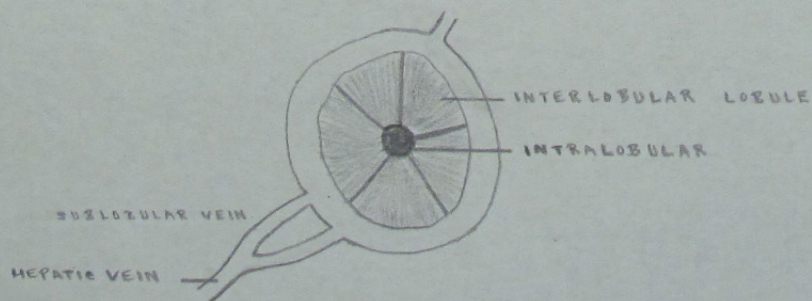
# THE STOMACH, LIVER AND PANCREAS



## THE GALL BLADDER.



## A LIVER CELL.





## Vitamins

Vitamins are essential for the well-being of the body.  
Vitamin A - contained chiefly in animal fat, butter, cod-liver oil, yolk of egg, raw cabbage, lettuce, spinach.

It is concerned with the growth of bone, teeth and other tissues.

Absence - causes rickets.

Vitamin B - contained in yolk of egg, germ of wheat, liver, fish (cod) roes, sweetbread, yams, some nuts, husk of rice, canned tomatoes.

Absence - causes sleeping sickness (uncommon here).

Vitamin C - contained in fruit and vegetables, lemons, oranges, tomatoes, cabbages, salads.

Absence - causes scurvy, hemorrhage (due to deterioration of walls of blood vessels).

Liver - largest gland in the body. Weight 50 to 60 oz.  
- situated against the diaphragm.  
- composed of two lobes (right and left).  
- the outer covering is the peritoneum.

Vessels of the liver -

portal vein - from stomach, spleen, intestines, pancreas. Carries impure blood, rich in food stuffs.

hepatic artery - a direct branch of the aorta.

hepatic vein - joins on inferior vena cava.

hepatic duct - this vessel carries bile.

- gall bladder is storehouse of bile.

Liver - made up of hepatic or liver cells or lobules.

Functions of liver

1) makes bile

2) prepares sugar

3) prepares urea

4) destroys worn out red corpuscles.

5) arrests metallic poisons

6) acts as storehouse for heat.



### Absorption by blood vessels.

- from mucous of alimentary canal.
- have no power of selection, but must take every kind of food that penetrates the walls of the capillaries.

### Absorption by lymphatic system.

- 1) lymph lacteals (many originate in the milli.)
  - these absorb fats.
  - they contain chyle during digestion
  - 2) watery fluid during fasting.
- 2) other lymphatics
  - blood that has escaped from blood vessels.
- 3) glands.
  - engaged in elaborating blood from lymph or chyle.

thoracic duct - situated in front of the backbone, chiefly thorax.  
- receptacle of chyle in lower portion in abdomen.

R. lymphatic - lymph enters B.S. by veins at root of neck.

### Muscles

Muscles - form  $\frac{2}{3}$  of weight of body.  
- red middle part called belly - this passes into tendon.  
- made up of small bundles of tissue.

Functions - 1) to move the body.  
2) to give the body shape.  
3) to act as protector to organs and joints.

A muscle has its origin, insertion and action.

There are two types of muscles

- 1) striated - voluntary muscles  
(exception) involuntary muscles of heart.
- 2) unstriated - involuntary muscles.



voluntary muscles - flexes & extends ) antagonistic muscles.

1) Sternocleidomastoid

Back Muscles

O - sternum + clavicle

I - mastoid process of head

A - to flex the head and rotate it to the opposite side.

2) Trapezius

O - occipital bone + cervical + dorsal vertebrae

I - in clavicle and scapula

A - to draw the head back + sideways + to elevate the shoulders.

3) Latissimus Dorsi

O - last 6 dorsal vertebrae, lumbar and sacral parts of the spine, lower ribs + scapula, tip of scapula.

I - spine of humerus

A - to draw arms downwards + backwards, to rotate the arms.

Chest Muscles

4) Pectoralis major

O - sternum + clavicle + six upper ribs

I - in the humerus (greater tuberosity)

A - 1) to draw arms downwards + forwards  
2) helps in climbing and forced inspiration

5) Pectoralis minor - underneath P. major

O - 3, 4, 5th ribs

I - in scapula

A - to depress the shoulders.



## Abdominal Muscles.

### 6) Internal oblique

O - lower 8 ribs

I - to crest of hip bone

A - to compress the viscera + flex the chest.

### 7) Internal oblique (underneath internal oblique.)

|

### 8) Rectus abdominus

O - from pubis bone.

I - to cartilage of 5, 6, 7<sup>th</sup> ribs.

A - to compress abdomen + flex the body.

## Arm Muscles.

### 9) Deltoid (course triangular muscle, covering top of the shoulder)

O - in clavicle

I - to shaft of humerus.

A - 1) to raise arms from side, to bring them at right angles to the body  
2) helps in carrying them forwards + backwards

### 10) Biceps (Brachialis - similar, but larger, to biceps) 2 heads.

O - scapula + humerus.

I - to radius

A - supinates forearm + flexes + abducts the arm.

### 11) Triceps - have three heads. situated at back of the arm.

O - scapula + back of humerus (twice)

all heads unite in a common tendon.

I - to the ulna.

A - 1) flexes + turns palm.

2) helps move the arm back.





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